Polymer Degradation and Stability

Papers Published in 1986

CONTENTS OF VOLUME 14

Number 1

The Photo-chemistry of Bisphenol-A Polycarbonate Reconsidered: Part 2—FTIR Analysis of the Solid-state Photo-chemistry in 'Dry' Conditions. 1
AGNÈS RIVATON, DANIEL SALLET and JACQUES LEMAIRE (France)

The Photo-chemistry of Bisphenol-A Polycarbonate Reconsidered: Part 3—Influence of Water on Polycarbonate Photo-chemistry 23
AGNÈS RIVATON, DANIEL SALLET and JACQUES LEMAIRE (France)

Influence of Repeated Processing on the Change in Properties of Polypropylene 41
Z. ZÁMORSKY and J. MURAS (Czechoslovakia)

Photo-Stabilisation and Photo-Degradation in Organic Coatings Containing A Hindered Amine Light Stabiliser. Part I—ESR Measurements of Nitroxide Concentration 53
J. L. GERLOCK, D. R. BAUER and L. M. BRIGGS (USA)

Photo-Stabilisation and Photo-Degradation in Organic Coatings Containing A Hindered Amine Light Stabiliser: Part II—Consumption of Hindered Amine 73
J. L. GERLOCK, T. RILEY and D. R. BAUER (USA)

The Effect of the Chemical Structure of Chain Ends on the Thermal Degradation of Polystyrene 85
L. COSTA, G. CAMINO (Italy), A. GUYOT, M. BERT, G. CLOUET and J. BROSSAS (France)

Book Reviews 95

Number 2

Photo-stabilisation and Photo-degradation of Organic Coatings Containing a Hindered Amine Light Stabiliser: Part III—Kinetics of Stabilisation During Free Radical Oxidation 97
D. R. BAUER and J. L. GERLOCK (USA)

Effect of the Metal on the Mechanism of Fire Retardance in Chloroparaffin–Metal Compound–Polypropylene Mixtures 113
L. COSTA, G. CAMINO and M. P. LUDA DI CORTEMIGLIA (Italy)

Degradation of Epoxy Polymers: Part 4—Thermal Degradation of Bisphenol-A Diglycidyl Ether Cured with Ethylene Diamine 125
NORMAN GRASSIE, MARILYN I. GUY and NORMAN H. TENNENT (Great Britain)

Study of the Photo-Oxidation Process in Polyethylene by a Polymerization Method 139
J. BARTŮS, J. BENISKA, A. HRIVÍK and A. MALÍKOVÁ (Czechoslovakia)

Thermo-Oxidative Stability of Polypropylene in the Presence of Substituted 3-Anilino-1,5-Diphenyl Pyrazoles 147
L. RYCHLÁ, J. RYCHLÝ, P. AMBROVIČ, K. CSOMOROVÁ (Czechoslovakia) and L. MÖGEL and M. SCHULZ (German Democratic Republic)

Mechanism of Condensed Phase Action in Fire Retardant Bismuth Compound–Chloroparaffin–Polypropylene Mixtures: Part I—The Rôle of Bismuth Trichloride and Oxychloride 159
L. COSTA, G. CAMINO and M. P. LUDA DI CORTEMIGLIA (Italy)

Mechanism of Condensed Phase Action in Fire Retardant Bismuth Compound–Chloroparaffin–Polypropylene Mixtures: Part II—The Thermal Degradation Behaviour 165
L. COSTA, G. CAMINO and M. P. LUDA DI CORTEMIGLIA (Italy)

Shrinkage Behaviour of Modified PAN Precursors—Its Influence on the Properties of Resulting Carbon Fibre. 179
R. B. MATHUR, T. L. DHAMI and O. P. BAHL (India)

Number 3

Study of the Kinetics and Mechanism of the Increase in the Molecular Mass of EPDM-Rubber During Ozonolysis in Solution 189
M. P. ANACHKOV, S. K. RAKOVSKY, D. M. SHOPOV (Bulgaria), S. D. RAZUMOVSKII, A. A. KEFELY and G. E. ZAIKOV (USSR)

Material Design of Radiation Resistant Polypropylene: Part II—Importance of the Smectic Structure Produced by Quenching Treatment 199
S. NISHIMOTO, T. KAGIYA, Y. WATANABE and M. KATO (Japan)

Degradation of Epoxy Polymers. Part 5—Photo-Degradation of Bisphenol-A Diglycidyl Ether Cured with Ethylene Diamine 209
NORMAN GRASSIE, MARILYN I. GUY and NORMAN H. TENNENT (Great Britain)

Degradation of Polyacrylamide in Aqueous Solution Induced by Chemically Generated Hydroxyl Radicals: Part I—Fenton's Reagent 217
D. K. RAMSDEN and K. McKAY (Great Britain)

ESR Study of the Pressure and Temperature Dependence of Free Radical Decay in γ-Irradiated Polyvinylpyrrolidone 231
F. SZŐCS, Z. HLOUŠKOVÁ and J. TIŇO (Czechoslovakia)

Photo-oxidation of Blends of Polycarbonate and Polypropylene 241
F. P. LA MANTIA (Italy)

The Photolyses of Deuterated Polystyrenes 249
N. A. WEIR, J. K. LEE (Canada) and J. ARCT (Poland)

Photoprotection of Wool with Sulfonated 2-(2′-Hydroxyaryl)-2*H*-benzotriazoles 263
N. A. EVANS, J. ROSEVEAR, P. J. WATERS and J. F. K. WILSHIRE (Australia)

Number 4

Monitoring UV Degradation of PVC by Oxidative Induction Period Analysis 285
M. G. OTEY (USA)

Influence of Hindered Piperidines on the Thermal Oxidation of Low Density Polyethylene 295
ALFONSO J. CHIRINOS PADRÓN, FELIPE A. SUAREZ and HECTOR BERROTERÁN (Venezuela)

A ^{119m}Sn Mössbauer Study of Tin/Molybdenum Oxidic Systems as Flame Retardants and Smoke Suppressants for Rigid PVC 307
PAUL A. CUSACK, PETER J. SMITH (Great Britain) and WILLIAM J. KROENKE (USA)

Thermal Oxidation of Linear Low Density Polyethylene 319
M. IRING, E. FÖLDES, K. BARABÁS, T. KELEN, F. TÜDŐS and L. ÓDOR (Hungary)

Studies of the Autoxidation of Polybutylene and Crosslinked Polyethylene by Isothermal Long-Term DTA 333
E. KRAMER and J. KOPPELMANN (Austria)

Environmental Degradation of Stabilized LDPE. Initial Step 341
FEBO SEVERINI, RAFFAELE GALLO, SALVATORE IPSALE and NATALINO DEL FANTI (Italy)

Photo-chemical Degradation of Polybutyleneterephthalate: Part 1—Photo-oxidation and Photolysis at Long Wavelengths 351
MOHAMMAD H. TABANKIA and JEAN-LUC GARDETTE (France)

The Effect of Temperature on the Photo-degradation of Polystyrene . . . 367
AYAKO TORIKAI, ATARU TAKEUCHI and KENJI FUEKI (Japan)

CONTENTS OF VOLUME 15

Number 1

Dual Photo-chemistries in Aliphatic Polyamides, Bisphenol A Polycarbonate and Aromatic Polyurethanes—A Short Review 1
JACQUES LEMAIRE, JEAN-LUC GARDETTE, AGNÈS RIVATON and AGNÈS ROGER (France)

The Degradation of Polyacrylamide in Aqueous Solution Induced by Chemically Generated Hydroxyl Radicals: Part II—Autoxidation of Fe^{2+} 15
D. K. RAMSDEN and K. McKAY (Great Britain)

Effect of Ozone on Rubbers: Countermeasures and Unsolved Problems . . 33
P. M. LEWIS (Great Britain)

Reactions of Sulfur Dioxide with Oxidized Polyolefins 67
D. J. CARLSSON, R. BROUSSEAU and D. M. WILES (Canada)

Hindered Amine Light Stabilisers—Interactions with Transition and Non-Transition Metals 81
STUART P. FAIRGRIEVE and JAMES R. MacCALLUM (Great Britain)

Book Reviews 95

Number 2

Chain-Breaking Antioxidant Activity of Phosphite Esters 97
K. SCHWETLICK, T. KÖNIG, C. RÜGER, J. PIONTECK and W. D. HABICHER (German Democratic Republic)

Thermal Properties of Polyurethanes Cross-linked with Chlorinated Rubber Graft Copolymers 109
K. ANBAZHAGAN, C. RAMI REDDY and K. THOMAS JOSEPH (India)

A Spectroscopic Study of the Carbonisation of Poly(Acrylonitrile) and Poly(Acrylonitrile-co-Acrylic Acid) 125
W. T. K. STEVENSON, A. GARTON, J. A. RIPMEESTER and D. M. WILES (Canada)

Primary Thermal Fragmentation Processes in Poly(Lactic Acid) Investigated by Positive and Negative Chemical Ionization Mass Spectrometry 143
DOMENICO GAROZZO, GIORGIO MONTAUDO and MARIO GIUFFRIDA (Italy)

Phosphorus-Containing Antioxidants: Part V—Mechanism of Hydroperoxide Decomposition by 4,8-Di-Tert-Butyl-2,10-Dimethyl-6-Phenoxy-Dibenzo[d,g]-1,3,6,2-Dioxathiaphosphocin 151
T. KÖNIG, K. SCHWETLICK (German Democratic Republic)
I. KŮDELKA and J. POSPÍŠIL (Czechoslovakia)

A Preliminary Investigation of the Surface Photo-oxidation of Copolymers of Styrene and 2-(2-Hydroxy-3-Vinyl-5-Methylphenyl)-Benzotriazole . . . 161
H. S. MUNRO, J. BANKS (Great Britain), A. RECCA, F. A. BOTTINO and A. POLLICINO (Italy)

Correlation of Physico-chemical, Mechanical and Electrical Properties of Ultraviolet-degraded Poly(Ethylene Terephthalate) 173
N. ILIŠKOVIĆ and M. BRAVAR (Yugoslavia)

Short Communication
The Thermal Decomposition of Oxidized Polyethylene Wax 183
DHOAIB AL-SAMMERRAI and WEJDAN SELIM (Iraq)

Book Review 189

Letter to the Editor 191

Number 3

Trace Determination of Hydroperoxides in LDPE by Spectrocolorimetry . . 193
J. PETRŮJ, S. ZEHNACKER, J. SEDLÁŘ and J. MARCHAL (France)

Photo-oxidation of Ethylene–Propylene Copolymers in the Solid State . . 205
RENÉ ARNAUD, JACQUES LEMAIRE (France) and A. JEVANOFF (Belgium)

Recent Developments in the Thermal Degradation of Polystyrene—A Review . 219
A. GUYOT (France)

Flexible Methylene Chain Length in Crosslinked Networks as a Measure of the Brittleness of γ-Irradiated Low Density Polyethylene Sheet 237
S. NISHIMOTO and V. T. KAGIYA (Japan)

Thermal Degradation of Modified Poly(α-methylstyrene) 251
L. COSTA, G. CAMINO (Italy), A. GUYOT, G. CLOUET and J. BROSSAS (France)

Analysis of Damage Profiles in Poly(methyl methacrylate) in Terms of Oxygen Diffusion and Consumption 265
B. DICKENS, J. W. MARTIN and D. WAKSMAN (USA)

Book Review 281

Number 4

Influence of Processing Conditions on the Photo-oxidation of Polypropylene Films 283
FRANCESCO P. LA MANTIA (Italy)

Changes in the Mechanical Properties and Chemical Structure of Polystyrene by γ-Irradiation 291
TAICHI OGAWA, SEI-ICHI NISHIMOTO, TSUTOMU KAGIYA and MIYUKI HAGIWARA (Japan)

The Stabilizing Action of β-Dicarbonyl Compounds in the Thermal Decomposition of Poly(vinyl chloride). 305
K. S. MINSKER, S. V. KOLESOV, V. M. YANBORISOV and G. E. ZAIKOV (USSR)

Photo-physics and Photo-chemistry of Aromatic Oxanilides Used as Polymer Light Stabilizers 311
MICHAEL ALLAN, THOMAS BALLY, EDWIN HASELBACH, PAUL SUPPAN and LAJOS AVAR (Switzerland)

Mechanism of the Chemical Degradation of Polymers: Part 2—Theoretical Analysis of the Kinetics of the Controlled Release of Drugs from Biodegrading Polymer Systems 327
G. E. ZAIKOV, A. L. IORDANSKY and V. S. LIVSHITS (USSR)

Investigations of the Formation, Detection and Reactivity of Ketochlorallyl Structures in PVC 335
J. BEHNISCH, H. ZIMMERMANN and H. ANDERS (German Democratic Republic)

Degradation Studies of Some Polyesters and Polycarbonates: Part 4—Poly(Ethylene Oxalate) 345
I. C. McNEILL and MARIA-LUISA PEREIRA LEÃO (Great Britain)

Thermal Stability of Three Homologous Series of Poly *N*-(*n*-alkyl) Maleimides. Relationship between Kinetic Parameters and Length of *n*-Alkyl Side Chain . 357
J. M. MAZÓN-ARECHEDERRA and J. M. BARRALES-RIENDA (Spain)

An ESCA Study of the Thermal Oxidation of Low Density Polyethylene . . 367
H. S. MUNRO and R. S. ALLAKER (Great Britain)

Contribution to the Study of Labile Structures in PVC 375
PETER ŠIMON (Czechoslovakia), GERARDO MARTÍNEZ and JOSÉ LUIS MILLÁN (Spain)

CONTENTS OF VOLUME 16

Number 1

Mechanisms of Antioxidant Action: Effect of Amine Complexing on the Photo-Antioxidant Activity of Zinc Diethyldithiocarbamate in Polypropylene 1
KHIRUD B. CHAKRABORTY and GERALD SCOTT (Great Britain)

Photo-degradation of Poly(styrene-co-methylmethacrylate) in the Solid Phase 13
AYAKO TORIKAI, ATSUHIRO HOZUMI and KENJI FUEKI (Japan)

Mechanisms of Antioxidant Action: Radical Addition Reactions of the Dialkyl Dithiophosphoric Acids and Their Derivatives to Natural Rubber . . . 25
S. AL-MALAIKA, S. HONGGOKUSUMO and G. SCOTT (Great Britain)

Thermal Dehydrochlorination and Stabilization of Poly(Vinyl Chloride) in Solution: Part 1—Conditions for Reliable Experimental Data 35
TRAN VAN HOANG and MICHEL BERT (France)

Thermal Stability of Cellulose Acetate Urethanes 47
M. B. SABNE (India)

Pyrolysis Studies on an Unsaturated Polyester Based on HET-acid, Maleic Anhydride and 1,2-Propanediol: Qualitative Analysis of the Products of Degradation and Mechanistic Aspects 53
G. H. IRZL, C. T. VIJAYAKUMAR, J. K. FINK and K. LEDERER (Austria)

Investigation of the Chlorine Balance in the Degradation of a HET-acid Based Unsaturated Polyester: Part II—The Chlorinated Organic Compounds . . 73
G. H. IRZL, C. T. VIJAYAKUMAR, J. K. FINK and K. LEDERER (Austria)

Thermal Degradation of Bromine-containing Polymers. Part 7—Poly(2,3-dibromopropyl methacrylate) and Poly(2,3-dibromopropyl acrylate) . . . 79
N. GRASSIE, M. A. M. DIAB and A. SCOTNEY (Great Britain)

Number 2

The Reason for the Low Stability of Poly(Vinyl Chloride)—A Review . . 99
K. S. MINSKER, S. V. KOLESOV, V. M. YANBORISOV, AL. AL. BERLIN and G. E. ZAIKOV (USSR)

Resist Polymers: Part VII—Thermolysis of Fluoroalkyl Methacrylates . . 135
PRADEEP K. DHAL, G. N. BABU (India) and JAMES C. W. CHIEN (USA)

Wavelength Effects on the Photo-chemistry of Poly(Vinyl Chloride) . . . 147
JEAN-LUC GARDETTE and JACQUES LEMAIRE (France)

Antioxidants and Stabilizers: Part CI—A Typical Impurity Contained in an Industrial Antiozonant, *N*-(1,3-Dimethylbutyl)-*N'*-Phenyl-1,4-Phenylenediamine 159
L. TAIMR, H. PIVCOVÁ and J. POSPÍŠIL (Czechoslovakia)

Study of the Spectrum Fading Curves of Disperse Dye on Cellulose Diacetate and Polyamide Films 163
F. M. TERA, M. N. MICHEAL and A. HEBEISH (Egypt)

A Study of the Photo-stabilizing Behaviors of β-Diketones 169
S.-K. WU, G.-S. DAI, L.-S. LIU and J.-K. CHANG (China)

Sulphonated 2-Hydroxyphenyl-*s*-Triazines as Photo-protective Agents for Wool 187
PETER J. WATERS and BRIAN MILLIGAN (Australia)

Radiation-induced Degradation of Polyethylene: Role of Amorphous Region in the Formation of Oxygenated Products and the Mechanical Properties . . 199
A. TORIKAI, R. GEETHA, S. NAGAYA and K. FUEKI (Japan)

Polymer Degradation and Stability—1986

Number 3

Thermooxidative Stability of Crosslinked Polypropylene 213
I. CHODÁK and L. MATISOVÁ-RYCHLÁ (Czechoslovakia)

Ageing of Rocket Insulator Compound Based on EPDM 221
A. SAHA DEURI and ANIL K. BHOWMICK (India)

The Thermal Degradation of Polymers of *n*-Butylcyanoacrylate Prepared Using Tertiary Phosphine and Amine Initiators 241
C. BIRKINSHAW and D. C. PEPPER (Ireland)

Measurement of Oxidation Stability of Polyolefins by Thermal Analysis . . 261
E. KRAMER and J. KOPPELMANN (Austria)

Antioxidants and Stabilisers—Part CV: Activity of Thiobisphenols as Melt Stabilizers 277
M. PRUSÍKOVÁ, I. KÚDELKA, J. BRODILOVÁ and J. POSPÍŠIL (Czechoslovakia)

The Kinetics of the Chemical Changes During Extrusion of Polyethylene . . 291
E. G. EL'DAROV, V. M. GOL'DBERG and G. E. ZAIKOV (USSR)

Number 4

Thermal Behavior of Poly(thiocarbonylthio-1,3-phenylene) 297
ELISABETTA MARIANUCCI, FRANCESCO PILATI and CORRADO BERTI (Italy)

Curing of Poly(*p*-Phenylene Sulphide) with Aromatic Dithiols 307
M. WEJCHAN-JUDEK (Poland)

Kinetics of the Growth of Cracks on Polyisoprene Vulcanizates in Ozone . 317
S. D. RAZUMOVSKY, V. V. PODMASTERIYEV and G. ZAIKOV (USSR)

Photolysis and Photo-oxidation of Ethylene–Ethyl Acrylate Copolymers . . 325
JEAN-FRANÇOIS GLIKMAN, RENÉ ARNAUD, JACQUES LEMAIRE and HENRI SEINERA (France)

Thermal Degradation Processes of Polyamides Investigated by Collision Activated Decomposition Mass Spectrometry/Mass Spectrometry 337
ALBERTO BALLISTRERI, DOMENICO GAROZZO, MARIO GIUFFRIDA and GIORGIO MONTAUDO (Italy)

Thermoplastic Elastomers: Part 2—Effect of Natural Rubber/Polypropylene as Solid Phase Dispersant in Polypropylene/Polyethylene Blends 347
S. AL-MALAIKA and E. J. AMIR (Great Britain)

Thermal Degradation of Bromine-containing Polymers. Part 8—Copolymers of 2,3-Dibromopropyl Methacrylate and 2,3-Dibromopropyl Acrylate with Methyl Methacrylate 361
N. GRASSIE, M. A. M. DIAB and A. SCOTNEY (Great Britain)